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- I. *Remarks upon some Dissertations lately publish'd at Paris, by the Rev. P. Souciet, against Sir Isaac Newton's Chronology. By Dr. Edmund Halley, Astronomer-Royal, F. R. S.*

There has been lately put into my hands a Book published last Year at *Paris* by Father *Souciet*, Jesuit, against our late President Sir *Isaac Newton* his *Chronology*, without waiting till the Book be published, and without knowing the Contents thereof, otherwise than by a short Extract, made at the desire of a very great Person, and without intention that it should be publickly seen. However, a Copy thereof having been (as I suppose) surreptitiously obtained and carried over into *France*, the same was first translated into *French*, and then printed at *Paris* with a pretended Refutation thereof by the same *P. Souciet*. Since then, Sir *Isaac* having answered, as he thought, his Objections, has thereby given him a handle to publish five other Dissertations against the new System of Chronology, as he calls it; the first and last of which, being chiefly Astronomical (since the great Author is no more) seem properly to fall under my examination, both on account of the Post in which I have the honour to serve his Majesty in quality of his Astronomer, as also from the long Acquaintance and Friendship that has subsisted between the Deceased and my self.

And first, I observe, that *P. Souciet* readily allows what seems to be the most exceptionable part of the whole System, *viz.* that *Chiron* the Centaur fixt the

Colures, in the ancient Sphere of fixt Stars, in the same places as *Hipparchus* tells us they had been supposed by *Eudoxus* many Centuries of Years after *Chiron*. His words are these, ἐν δὲ τῇ εἰρέσει καλὰ φησὶ κεῖσθαι τὴν κήρυκα τὴν κεφαλὴν, καὶ τὴν κεῖσθαι τὰ νώτα κατὰ πλάττω. This, undoubtedly, was the Position of the Colure of the Vernal Equinox many Ages before *Eudoxus*; but whether so old as *Chiron*, and the *Argonautick* Expedition, I shall not undertake at this time to enquire; but only observe, that *P. Souciet* in his *Fastes du Monde*, or Abridgment of his Chronology, prefixt to these Dissertations, makes the *Argonautick* Expedition 1467 Years before our *Æra* of the Birth of Jesus Christ; and the taking of *Troy* 1388 Years before it, which Date is 120 Years sooner than the *Parian* Chronicle, read and publisht by our Learned *Selden* in his *Marmora Arundeliana*, makes it; and above 500 Years earlier than the time assigned by Sir *Isaac Newton*.

Now both of them making use of the same Premises, it may seem strange that their Conclusions should be so widely distant: And indeed upon a Præpossession that the *Argonautick* Expedition and the Siege of *Troy* could not have been less than 1000 Years before Christ, I must own, I was at first somewhat prejudiced in favour of *P. Souciet*, taking his Calculations for granted; and not having seen Sir *Isaac's* Work. But observing that he quotes Sir *Isaac*, as saying, that in consequence of what *Hipparchus* has recorded from *Eudoxus*, the Equinoctial Colure in the old Sphere was about $7^{\circ} 36'$ from the first Star of *Aries*, I was resolv'd to examine the matter with due Attention, especially since the Good Father seems to triumph over his Adversary, and to treat a Man of his Figure in the Commonwealth of Learning in a very ludicrous manner, notwithstanding the several fine things he says of him to palliate it.

I find

I find the Dispute to be chiefly over what part of the Back of *Aries* the Colure pass: The Words of *Hipparchus*; as from *Eudoxus*, are simply, that it pass over the Back, without saying over what Star, or over what part of the Back it pass. And the same *Hipparchus* shews, that if it pass over the Star in the middle of the Back, it greatly differed from the Situation thereof in his time; and conceiving thence that the *Æquinoctial* Points might have a regressive motion, he was the first that attempted to define their motion; but having no Observations older than those of *Timocharis*, made within less than 200 Years of his own time, and very course withal, he was not able to determine the quantity thereof, but guess it to be about a Degree in 100 Years; which length of time and the more curious Observation of the Moderns has now proved to be $19\ 24'$. or rather $50''$ per Annum.

In a word, Sir *Isaac* takes the Colure to have pass over the middle of the Constellation of *Aries*, and very near the Star in the middle of the Back (*v* *Bayero*). And *P. Souciet* will have it, that it pass over the middle of the Sign or *Dodecatemorion* of *Aries*, reckoning the Sign to begin with the first Star of the Constellation; and by consequence his Colure must pass about midway between the Rump and first of the Tail of *Aries* (*e* and *d* *Bayero*;) which Situation could never be said to be over the Back: But whilst Sir *Isaac* makes the Colure but $79\ 36'$, from the first Star of *Aries*, which *P. Souciet* makes 15 Degrees from it, the difference $7^{\circ}\ 24'$ at $50''$ per Annum, makes 533 Years difference in the result.

Let us now examine when the Stars in question did actually pass under the Colure of the Vernal *Æquinox*, assuming their places as they are in Mr. *Flamsteed's British Catalogue*, fitted to the beginning of the Year 1690.

He places the first Star of *Aries* in $28^{\circ} 51'$ of *Aries* $7^{\circ} 9'$ North Latitude. And supposing the Obliquity of the Ecliptick $23^{\circ} 29'$, it will be as Radius to the Tangent of $23^{\circ} 29'$:: so the Tangent of $7^{\circ} 9'$ to the Sine of $3^{\circ} 7' \frac{1}{2}$, the difference of Longitude between the Star and the Point in the Ecliptick which past under the Colure at the same time with the Star ; so that this Point was, *Anno 1690 ineunte*, in $\Upsilon 25^{\circ} 43' 30''$, and therefore allowing $50''$ per *Annum*, the Star was under the Colure 1852 Years before the *Epocha* of the *British* Catalogue, that is, 162 Years before our *Æra* of the Nativity of Jesus Christ, in which very Year *Hipparchus* began to observe the *Æquinoxes* recorded by *Ptolemy*, *Lib. III. Cap. 2.*

If therefore with Sir *Isaac* we add $7^{\circ} 36'$ to the Long. of the first Star of *Aries*, as it was in 1690, we shall have $36^{\circ} 27'$, which the Colure moves in 2624 Years: And deducting 1690 therefrom, we shall have 934 Years before Christ for the *Argonautick Expedition*. And if to $7^{\circ} 36'$ we add $3^{\circ} 7' \frac{1}{2}$ we shall have $10^{\circ} 43' \frac{1}{2}$, that is, 772 Years before the first Star of *Aries* past the Colure.

Next let us inquire when the Star in the middle of the Back of *Aries* (*v Bayero*) past the Colure. Its Longitude *Anno 1690 ineunte*, was $9^{\circ} 48' 35''$ of *Taurus*, with North Lat. $6^{\circ} 8'$; but by the foregoing Analogy, the Point in the Ecliptick, over which the Colure past at the same time with it, was $2^{\circ} 40' \frac{1}{2}$ before it, that is in $\varnothing 7^{\circ} 8'$. Now $37^{\circ} 8'$ give 2674 Years nearly, or 984 Years before Christ, when that Star was under the *Æquinoctial* Colure, being but half a Century earlier than Sir *Isaac* places the *Argonautick Expedition*; and shews that he took the middle of *Aries* over which the Colure is supposed to have past, to be the middle of the Constellation, and not of the *Dodecatemorion*, and in so doing,

doing, no doubt, had reason to place this Colure $7^{\circ} 36''$ in consequence of the first Star of *Aries*, instead of $8^{\circ} 17'$ as it was when the Star in the middle of the Back of *Aries* was under the Colure.

But if with *P. Souciet*, you make the Colure to intersect the Ecliptick 15 Degrees from the first Star of *Aries*, or $43^{\circ} 51'$ from the Equinoctial Point, as it was *Anno* 1690, we shall have the time nearly 1470 Years before Christ; but then the Colure will be very far from the middle of the Back of *Aries*, and leave only his Tail to the Eastward, as it leaves the Head of the Whale to the Westward, so as by no means to agree with the Description we have of it from *Hipparchus*; which it were to be wisht had been more definitive, and as well circumstanced as what *Hipparchus* has left us of the Position of the Colures in his own time, which upon examination I find to be very consistent, and the Observations made with sufficient care:

Thus I hope, I have shewn *P. Souciet*, that there was no Affectation of Mystery in Sir *Isaac's* placing the Colure $7^{\circ} 36'$ from the first Star of *Aries*, nor any occasion to drole as he does Pag. 131, 132. on that account; as also that he ought to have deducted $3^{\circ} 7' \frac{1}{2}$ out of the 15 Degrees he assumes for the distance of his Colure from the first Star of *Aries*, which will bring him 255 Years nearer to Sir *Isaac Newton's* time. He is likewise entreated in the next Edition of his Dissertations to be a little more careful of his Numbers than he has been Pag. 134, 135, and inform himself in the Sphericks, so as to give us the Right Ascensions of the Stars truly, from their given Longitudes and Latitudes.

Lastly,

Lastly, I would inform him, that the Star in the Centaur which *Hipparchus* describes, as being in his time very near the Autumnal Colure, was not Ψ of *Bayer*, but certainly Φ , and that, *anno ineunte* 1690. its Longitude was *Scorpio* $8^{\circ} 43' 40''$, with South Latitude $27^{\circ} 59'$. But the Colure passing through that Star, by the Proportion given above, cuts the Ecliptick $13^{\circ} 20' 50''$ in Antecedence of the Star that is in *Libra* $25^{\circ} 22' 50''$. But $25^{\circ} 22' 50''$ give 1827 Years : wherefore the Time this Star was in the Colure was 137 Years before Christ, when *Hipparchus* flourished and might very well observe it.
